

Application No: 10/779,454
Amendment dated August 16, 2006
Reply to Office Action Dated June 15, 2006

Attorney Docket No: 3926.063

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IN THE SPECIFICATION

Please replace paragraph [0002] with the following:

[00033] A device of this type is known from DE 101 17 516 A1. The device includes sensors which monitor the door swing area, an evaluation unit which evaluates the sensor data, and a control unit which controls of the components of the door area monitoring device. The sensors are radar sensors, which sense and monitor a ~~defined~~ defined area adjacent the vehicle doors. These sensors are typically micro-strip antennas, which are of considerable size.

Please replace paragraph [0005] with the following:

[0005] The present invention is concerned with the task[[,] of providing a door area monitoring device ~~according to the precharacterizing portion of patent Claim 1~~, which is designed to be compact as well as to make possible a sufficiently reliable identification of interfering objects, which could result in a collision with the vehicle door.

Please replace paragraph [0006] with the following:

[0006] This task is solved by a door area monitoring device ~~with the characteristics of Patent Claim 1~~ for monitoring a door swing area of a vehicle door including a sensor sensing in the door swing area, a sensor-data evaluating evaluation unit and a control unit for controlling the sensor or the evaluation unit, where a monitoring area sensed by the sensor is substantially two-dimensional, that the sensor includes at least one light source for emission of a pivotable light beam, at least one micro-mirror-unit and at least one photo-detector for monitoring the two-dimensional monitoring area.

Please cancel paragraph [0007].

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Please replace paragraph [00027] with the following:

[00033] The laser diode 3 is provided with a lens 3a, which acts as collimator for the light beam emitted by the laser diode. The light beam is cast upon the micro-mirror-unit 4. The micro-mirror-unit 4 includes a number of micro-mechanically driven micro-mirrors. These are controlled by a control unit provided on a circuit board [[5]] 6 in such a manner, that the micro-mirrors can be pivoted, driven micro-mechanically. The pivoting is so controlled, that a pivoting light beam is emitted from the sensor means 1. The micro-mechanically driven micro-mirrors are provided upon a common carrier, which is in a rigid static connection with the housing 2 of the sensor means 1. The moved light beam is so moved via the pivotable micro-mirror, that it swings through a two dimensional monitoring area. The light beam is reflected from objects which penetrate into the monitored area or are located in this area, and this light is picked up by the photo-detector lens 5a and is bundled and collected on the photo-detector 5. The photo-detector 5 converts the reflected light into electrical signals, which are submitted to an evaluation unit provided on the circuit board 6. This evaluation unit determines, on the basis of the electrical signals supplied to it from the photo-detector 5, whether objects have or have not entered into the monitored area.

Please replace paragraph [00029] with the following:

[00033] The electrical received signal supplied from the photo-detector 5, which represents the reflected received light, is supplied to an amplifier 10, which amplifies the electrical signal and therewith makes possible a phase delay measurement through the phase delay measurement unit 11 in particular measure or degree. The phase delay measurement unit 11 is supplied, in addition to the amplified received signal, also with a reference signal, which is generated by signal generator 12. This signal generator generates the modulation signal for the laser driver 13, which is associated with the laser light source [[2]] 3. In recognition of the modulation of the light emitted by the laser source [[2]] 3 and the modulation of the received light or as the case may be the reference signal, which is generated by the signal generator 12, or as the case may be

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the electrical received signal, it becomes possible to determine the length of the light path from the light source ~~[[2]]~~ 3 to the object causing the reflection to the photo-diode 5, and therewith the distance S1 between the reflecting object (obstacle) to the sensor means. The distance S1 is compared with a reference distance S2. This comparison occurs in the comparator stage 20. If the distance S1 is smaller than the reference distance S2, which represents a value for a dimension of the vehicle door, then it is concluded therefrom, that this is an actual impediment or obstacle, and this could lead to a door stop signal. On the basis of this door stop signal an automatic door opening process is interrupted and therewith a further automatic opening, that is, a further pivoting of the door, is prevented. If the distance S1 is larger than the reference value S2, then it is concluded therefrom, that this is not a relevant obstacle which could lead to a damaging of the door, since it lies outside the swing coverage of the vehicle door.

The abstract of disclosure is replaced by the following:

~~{00033}~~ The invention concerns a A door space monitoring device for monitoring a door swing area of a vehicle door:

~~{00034}~~ The door space monitoring device is provided with a door swing space monitoring sensor means, with a sensor-data evaluating evaluation device, and with a control unit for controlling the sensor means or evaluation device. The sensor means includes a light source for emission of a pivotable light beam, a micro-mirror-unit and a photo-detector for sensing the two dimensional monitored area. Preferably the micro-mirror-unit is provided with at least one micro-mechanical pivotable planar mirror and an additional non-planar mirror. The door space monitoring device is characterized by a very compact and reliable functionality.